

Amendments to the Claims

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

Claims 1-28 (Canceled)

Claim 29 (Previously Presented): A cartridge for characterizing particles suspended in a liquid sample, comprising:

a housing with connectors for operational connection to and disconnection from corresponding connectors of a docking station for establishment of electrical and fluid connections when the cartridge is received in the docking station,

a first mixing chamber,

a bore in an outer surface of the housing for entrance of the liquid sample,

a first sampling member positioned in the housing for sampling the liquid sample and having a first cavity for receiving and holding the liquid sample, the first sampling member being movably positioned in relation to the housing in such a way that in a first position, the first cavity is in communication with the bore for entrance of the liquid sample into the first cavity, and in a second position the first cavity is in communication with the first mixing chamber for discharge of the liquid sample into the first mixing

chamber whereby the sampling member operates to receive and hold a precise volume of the liquid sample and to transfer the liquid sample to the first mixing chamber,

a first collection chamber separated by a first wall from the first mixing chamber, the first wall having a first orifice for the passage of particles between the first mixing chamber and the first collection chamber, and

a first particle characterizer that characterizes the particles passing through the first orifice.

Claim 30 (Previously Presented): A cartridge according to claim 29, further comprising:

a second mixing chamber and a second collection chamber separated by a second wall containing a second orifice for the passage of the particles between the second mixing chamber and the second collection chamber, and

a second particle characterizer that characterizes the particles passing through the second orifice,

wherein when the first sampling member is in the second position, the first cavity is in communication with the first mixing chamber for entrance of the liquid sample from the first mixing chamber into the first cavity, and when the first sampling member is in a third position, the first cavity is in communication with the second mixing chamber for discharge of the liquid sample in the first cavity into the second mixing chamber.

Claim 31 (Previously Presented): A cartridge according to claim 29, further comprising:

a second mixing chamber and a second collection chamber separated by a second wall containing a second orifice for the passage of the particles between the second mixing chamber and the second collection chamber,

a second particle characterizer that characterizes the particles passing through the second orifice, and

a second sampling member positioned in the housing for sampling a small and precise volume of the liquid sample from the first mixing chamber and having a second cavity for receiving and holding the liquid sample, the second sampling member being movably positioned in relation to the housing in such a way that in a first position, the second cavity is in communication with the first mixing chamber for entrance of the liquid sample from the first mixing chamber into the first cavity, and in a second position the second cavity is in communication with the second mixing chamber for discharge of the liquid sample in the second cavity into the second mixing chamber.

Claim 32 (Previously Presented): A cartridge according to claim 29, further comprising a reagent chamber positioned adjacent to the first mixing chamber for holding a reagent to be entered into the first mixing chamber.

Claim 33 (Previously Presented): A cartridge according to claim 32, further comprising a breakable seal separating the reagent chamber from the first mixing chamber.

Claim 34 (Previously Presented): A cartridge according to claim 29, wherein the first particle characterizer includes a first electrode in the first mixing chamber and a second electrode in the first collection chamber, the first and second electrodes being electrically connected to respective terminal members accessible at the outer surface of the housing.

Claim 35 (Previously Presented): A cartridge according to claim 29, wherein the housing further comprises a liquid storage chamber for holding a liquid, the liquid storage chamber communicates with the first cavity when the first sampling member is in the second position so that liquid can be discharged from the liquid storage chamber through the first cavity of the first sampling member and into the first mixing chamber together with the liquid sample.

Claim 36 (Previously Presented): A cartridge according to claim 30, wherein the housing further comprises a liquid storage chamber for holding a liquid to be discharged from the liquid storage chamber through the first cavity and into the second mixing

chamber together with the liquid sample.

Claim 37 (Previously Presented): A cartridge according to claim 29, comprising a volume meter that determines a beginning and an end of a period during which a predetermined volume of liquid has passed through the first orifice.

Claim 38 (Previously Presented): A cartridge according to claim 37, wherein the volume meter comprises a volume metering chamber with an input communicating with the first collection chamber, and an output, and wherein presence of liquid is detected by the volume meter at the input and at the output, respectively.

Claim 39 (Previously Presented): A cartridge according to claim 38, wherein presence of liquid is detected with an electrode positioned at the input and a further electrode positioned at the output.

Claim 40 (Previously Presented): A cartridge according to claim 38, wherein presence of liquid is detected optically.

Claim 41 (Previously Presented): A cartridge according to claim 29, wherein the first mixing chamber and the first collection chamber have transverse cross-sectional areas at a level of the first orifice, the transverse cross-sectional areas are substantially less than transverse cross-sectional areas of the first mixing chamber and the first collection chamber over a substantial part above the first orifice.

Claim 42 (Previously Presented): A cartridge according to claim 29, wherein a surface defining the first cavity of the first sampling member has an anti-coagulation reagent.

Claim 43 (Previously Presented): A cartridge according to claim 35, wherein the liquid storage chamber holds chemical reagents for modification of the liquid sample.

Claim 44 (Previously Presented): A cartridge according to claim 29, wherein a mixing member is positioned in the first mixing chamber.

Claim 45 (Previously Presented): A cartridge according to claim 44, wherein the mixing member is magnetic.

Claim 46 (Previously Presented): A cartridge according to claim 29, further comprising a sensor for characterization of the liquid sample.

Claim 47 (Previously Presented): A cartridge according to claim 46, wherein the sensor for characterization of the liquid sample is adapted for spectrophotometric characterization of the liquid sample.

Claim 48 (Previously Presented): A cartridge according to claim 29, wherein the housing further comprises a pump chamber communicating with the first collection chamber and having a pump actuator for causing liquid flow through the first orifice.

Claim 49 (Previously Presented): A cartridge according to claim 48, wherein the pump actuator is a piston.

Claim 50 (Previously Presented): A cartridge according to claim 48, wherein the pump actuator is a membrane.

Claim 51 (Currently Amended): A method of operating a particle characterization apparatus comprising a cartridge according to claim [[36]] 35, the cartridge being

demountable from the apparatus, the method comprising:

sampling liquid containing particles with the cartridge through the bore with the first sampling member in the first position,

positioning the cartridge in the apparatus,

moving the first sampling member to the second position,

pumping liquid from the [[first]] liquid storage chamber through the first cavity and into the first mixing chamber together with the liquid sample,

making particle characterizing measurements,

disconnecting the cartridge from the apparatus, and

discarding the cartridge.

Claim 52 (Previously Presented): A method of operating a particle characterization apparatus comprising a cartridge according to claim 31, the cartridge being demountable from the apparatus and further comprising a first liquid storage chamber and a second liquid storage chamber for both holding liquid, the method comprising:

sampling liquid containing particles with the cartridge through the bore with the first sampling member in the first position,

positioning the cartridge in the apparatus,

moving the first sampling member to the second position,
pumping liquid from the first liquid storage chamber through the first cavity and
into the first mixing chamber together with the liquid sample,
sampling a liquid sample from the first mixing chamber with the second sampling
member in the first position,
moving the second sampling member to the second position,
pumping liquid from the second liquid storage chamber through the second
cavity and into the second mixing chamber together with the liquid sample,
making particle characterizing measurements with the first and second particle
characterizers,
disconnecting the cartridge from the apparatus, and
discarding the cartridge.

Claim 53 (Previously Presented): An apparatus for characterizing particles suspended
in a liquid, comprising:

a cartridge according to claim 29, and

a docking station for removably receiving the cartridge, comprising connectors for
operational connection with the first particle characterizer when the cartridge is received

in the docking station.

Claim 54 (Previously Presented): An apparatus according to claim 53, wherein the cartridge further comprises a first port communicating with the first collection chamber for causing liquid flow through the first orifice, and

the docking station further comprises a port for forming a gas connection with the first port when the cartridge is received in the docking station for application of a pressure causing a liquid flow through the orifice.

Claim 55 (Canceled)

Claim 56 (Currently Amended): An apparatus according to claim [[61]] 31, wherein the cartridge further comprises a first port communicating with the first collection chamber for causing liquid flow through the first orifice, and a second port communicating with the second collection chamber for causing liquid flow through the second orifice, and

the docking station further comprises a first port and a second port for forming a gas connection with the first port and the second port of the cartridge when the cartridge is received in the docking station for application of a pressure causing liquid

flow through the first orifice and the second orifice.

Claim 57 (Previously Presented): A cartridge according to claim 31, wherein the second particle characterizer includes a first electrode in the second mixing chamber and a second electrode in the second collection chamber, the first and second electrodes being electrically connected to respective terminal members accessible at the outer surface of the housing.

Claim 58 (Previously Presented): A cartridge according to claim 31, wherein the housing further comprises a liquid storage chamber for holding a liquid to be discharged from the liquid storage chamber through the second cavity and into the second mixing chamber together with the liquid sample.

Claim 59 (Previously Presented): A cartridge according to claim 30, comprising a volume meter that determines a beginning and an end of a period during which a predetermined volume of liquid has passed through the second orifice.

Claim 60 (Previously Presented): A cartridge according to claim 31, comprising a volume meter that determines a beginning and an end of a period during which a predetermined volume of liquid has passed through the second orifice.

Claim 61 (Previously Presented): An apparatus for characterizing particles suspended in a liquid, comprising:

a cartridge according to claim 30, and
a docking station for removably receiving the cartridge, comprising connectors for operational connection with the first particle characterizer and the second particle characterizer when the cartridge is received in the docking station.

Claim 62 (Previously Presented): An apparatus for characterizing particles suspended in a liquid, comprising:

a cartridge according to claim 31, and
a docking station for removably receiving the cartridge, comprising connectors for operational connection with the first particle characterizer and the second particle characterizer when the cartridge is received in the docking station.

Claim 63 (Previously Presented): A cartridge for characterizing particles suspended in a liquid sample, comprising:

a housing with connectors for operational connection to and disconnection from corresponding connectors of a docking station for establishment of electrical and fluid connections when the cartridge is received in the docking station,

a first mixing chamber,

a bore in an outer surface of the housing for entrance of the liquid sample,

a first movable sampling member positioned in the housing for sampling the liquid sample and having a first cavity for receiving and holding a precise volume of the liquid sample, and for discharging the held liquid sample into the first mixing chamber,

a first collection chamber separated by a first wall from the first mixing chamber, the first wall having a first orifice for the passage of particles directly from the first mixing chamber to the first collection chamber, and

a first particle characterizer that characterizes the particles passing directly from the first mixing chamber to the first collection chamber through the first orifice.

Claim 64 (Previously Presented): The cartridge according to claim 63, wherein the first particle characterizer includes a first electrode in the first mixing chamber and a second electrode in the first collection chamber.